Patent claims

1. An optical inclinometer comprising

- a radiation source (2) for generating radiation (S);
- at least one further medium (11, 13) whose position is inclination-dependent;
- a receptacle (6, 6') for the first medium (11, 13);
- a detector for recording and converting an image (16, 16', 16'', 16''') into signals; and
- an evaluating unit (10) for determining the inclination;

wherein

the detector is in the form of a camera (9), preferably in the form of a CMOS or CCD micro-camera, and

radiation source (2) and camera (9) are arranged so that an image of at least a part of the first medium (11, 13) is reproduced indirectly or directly on the camera (9) by the radiation.

2. The optical inclinometer as claimed in claim 1,

wherein radiation source (2) and camera (9) are arranged so that an image of at least a part of a, preferably substantially flat, interface (14) of the first medium (11, 13) is reproduced indirectly or directly on the camera (9) by the radiation.

3. The optical inclinometer as claimed in claim 2, wherein the first medium (11, 13) is a liquid and the interface (14) is a liquid horizon

4. The optical inclinometer as claimed in claim 3, wherein the receptacle (6, 6') is designed as a cylindrical can which is preferably half-full.

5. The optical inclinometer as claimed in any of claims 2 to 4, wherein the inclinometer has, as a second medium (12),

- a gas,
- a liquid or
- a solid, in particular in the form of a float,

whose contact surface with the first medium (11, 13) defines the interface (14).

6. The optical inclinometer as claimed in claim 6, wherein the first medium (11, 13) and the second medium (12) have different transmission ratios, preferably different coefficients of transmission, for the radiation (S), in particular wherein one of the two media is impermeable to the radiation (S).

7. The optical inclinometer as claimed in claim 1, wherein the first medium (11, 13) is a pendulum-like solid.

8. The optical inclinometer as claimed in any of the preceding claims, wherein the radiation source (2) has a semiconductor laser or an LED.

9. The optical inclinometer as claimed in any of the preceding claims, wherein radiation source (2) and camera (9) are arranged so that the radiation (S) in the region of the first medium (11, 13) is passed substantially parallel to a surface of the first medium (11, 13).

10. The optical inclinometer as claimed in any of the preceding claims, wherein the receptacle (6, 6') is mounted indirectly or directly on the camera (9).

11. The optical inclinometer as claimed in any of the preceding claims, wherein the receptacle (6, 6') has

- a first flat, transparent surface (7) and
- a second transparent surface (8)

which are oriented substantially parallel to one another, the second surface (8) being flat or arched.

12. The optical inclinometer as claimed in claim 11, wherein the camera (9) has a two-dimensional

detector surface (15) which is oriented parallel to the first surface (7) and/or to the second surface (8) of the receptacle (6, 6').

13. The optical inclinometer as claimed in any of the preceding claims, wherein radiation source (2) and camera (9) are mounted on a common base (1, 1'), preferably a circuit board.

14. The optical inclinometer as claimed in claim 13, wherein radiation source (2) and camera (9) are arranged so that the radiation (S) produced is emitted perpendicularly to the surface of the base (1, 1') and the receiving means of the camera (9) is oriented perpendicularly to the surface of the base (1, 1').

15. The optical inclinometer as claimed in claim 13 or 14, wherein a beam path from the radiation source (2) to the camera (9) has at least one deflecting element (4, 5).

16. A geodetic device, in particular distance-measuring instrument or plumb staff, comprising an inclinometer as claimed in any of claims 1 to 15.

17. A method for measuring the inclination of a device, in particular of a geodetic device, comprising

- a radiation source (2) for producing radiation (S);

- at least one first medium (11, 13) whose position is inclination-dependent;

- a receptacle (6, 6') for the first medium (11, 13);

- a camera (9) for recording images; and

- an evaluating unit (10) for determining the inclination of the device;

comprising the steps

- production of an image on the camera (9) by means of radiation (S) produced by the radiation source, the image including at least a part of the first medium (11, 13),

- recording and conversion of the image into signals by the camera (9),

- determination of the inclination of the device from the signals by the evaluating unit (10).

18. The method as claimed in claim 17, wherein, in producing an image, the radiation (S) is passed substantially parallel to a surface of the first medium (11, 13).

19. The method as claimed in either of claims 17 and 18, wherein the determination of the inclination is effected taking into account

- the angle of the first medium (11, 13) in the image and
- the absolute position of the first medium (11, 13) in the image.

20. The method as claimed in any of claims 17 to 19, wherein a signal is output on reaching or exceeding a predeterminable inclination value.

21. The method as claimed in any of claims 17 to 20, wherein, in the determination of the inclination, errors due to temperature effects and/or substance losses of at least the first medium (11, 13) are taken into account, in particular eliminated.

22. The method as claimed in any of claims 17 to 21, wherein, in producing an image, at least one interface (14) of the first medium (11, 13) is reproduced.

23. The method as claimed in claim 22, wherein, in the determination of the inclination of the device, the extent, shape and/or position of the interface (14) is taken into account.